

THE ORIENTAL SPECIES OF THE GENUS *DIBEZZIA* KIEFFER  
(DIPTERA: CERATOPOGONIDAE)

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*Abstract.*—A revised diagnosis is given of the genus *Dibezzia* Kieffer, based on the type-species, *D. clavata* Kieffer, and a new species, *D. debenhamae* which is described from Malaysia and Thailand. Three species previously placed in *Dibezzia* are transferred to other genera: *Dibezzia himalayae* Kieffer to *Palpomyia* Meigen, *Heteromyia indica* Kieffer to *Mackerrasomyia* Debenham, and *Dibezzia longistila* Kieffer to *Johannsenomyia* Malloch. The generic position of *Dibezzia brevistila* Kieffer is doubtful, but it is suggested that the species may belong to *Leehelea* Debenham. Taxonomic notes are given for *Mackerrasomyia indica*.

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In his catalog of Oriental Ceratopogonidae Wirth (1973) listed five species of *Dibezzia* Kieffer. We have made a more critical study of Kieffer's descriptions of these species and believe we can more accurately place them in the following genera:

1. *Dibezzia brevistila* Kieffer, 1911a: 122. Bangladesh. Position doubtful, tarsal claws missing; large size, body color, femoral spines, and black punctations on the legs suggest a species of *Leehelea* Debenham.
2. *Dibezzia clavata* Kieffer, 1911a: 120. India. Type-species of *Dibezzia*.
3. *Dibezzia himalayae* Kieffer, 1911b: 328. India. To genus *Palpomyia* Meigen, NEW COMBINATION.
4. *Dibezzia-indica* (Kieffer), 1913: 183 (*Heteromyia*). India. To *Mackerrasomyia* Debenham, NEW COMBINATION.
5. *Dibezzia longistila* Kieffer, 1911a: 121. India. To *Johannsenomyia* Malloch, NEW COMBINATION.

We are taking this opportunity to give a revised diagnosis of *Dibezzia*, adding characters that we have taken from a second Oriental species of the

genus that we are here describing from a series from Malaysia and Thailand. Some notes are also given on *Mackerrasomyia indica*.

### Genus *Dibezzia* Kieffer

*Dibezzia* Kieffer, 1911a: 120 (type-species, *Dibezzia clavata* Kieffer, by original designation); Kieffer, 1913: 165 (in generic key); Kieffer, 1917: 296 (in generic key); Johannsen, 1931: 406 (in generic key); Macfie, 1940: 26 (in generic key; notes); Wirth et al., 1974: 610 (in generic key).

Diagnosis.—Slender, shining black species. Eyes (Fig. 1c) contiguous, bare. Female antenna (Fig. 1a) slender, distal 5 segments very elongate, cylindrical. Palpus (Fig. 1b) short, 5-segmented. Thorax (Fig. 1e) with coarse, bent, integumental microspines as in *Johannsenomyia* Malloch; mesonotum with small, upright, anteromedian spine. Legs (Fig. 1g) long and slender; femora unarmed, slightly clubbed distally except hindpair distinctly clubbed. Tarsi (Fig. 1h) slender, female hindtarsus extremely elongate; 4th tarsomeres cylindrical, greatly elongated on hindleg; female 5th tarsomeres (Fig. 1i) armed ventrally with 4–5 pairs of long, blunt, black batonnets along entire length of segment. Fifth tarsomere of hindleg of male without batonnets. Female claws very unequal on all legs, each with short, blunt, external, basal tooth; on hindleg longer claw may be longer than 5th tarsomere. Wing (Fig. 1f) relatively broad; two radial cells usually present, the crossvein between them sometimes obsolete; costa extending to 0.8 of wing length. Female abdomen (Fig. 1j) petiolate, 8th segment without sclerotization or ventral hair tufts; 2 large spermathecae (Fig. 1k) present. Male genitalia (Fig. 1l) elongate, with greatly elongated, slender basistyle and short, hook-like dististyle; aedeagus simple, tapering; parameres separate, with straight, slightly expanded, paddle-shaped apices. Pupa (Fig. 1n,o) with short, moderately broad respiratory horn; abdomen with lateral posteromarginal tubercles developed as strong spines; last segment with greatly elongated, slender, pointed, apical processes.

Discussion.—The genus *Dibezzia* is most closely related to *Johannsenomyia* Malloch (Wirth et al., 1974), both genera having the legs slender and unarmed with the femora more or less clubbed distally, the abdomen more or less petiolate, the mesonotum with a distinct upright anteromedian spine or tubercle and the integument with characteristic bent spinules arising from distinct microtubercles, the body usually shining dark brown to blackish and the wings not whitish, the costa extending to about 0.8 of the wing length, usually two radial cells present, and the female fifth tarsomeres bearing numerous black ventral batonnets along the length of the segment, the tarsal claws unequal on at least the posterior four legs, and each claw

with a short external basal tooth. In *Johannsenomyia* the claws of the anterior legs of the female are equal, the fourth tarsomere of the hindleg of females is not elongated, the fifth tarsomere of the male hindleg is armed with several pairs of batonnets, the female abdomen bears a pair of hair tufts on the eighth sternum, and the male genitalia are short and stout, whereas in *Dibezzia* the female claws are unequal on all legs, the fifth tarsomere of the male hindleg is unarmed, and the male genitalia are elongate with slender basistyle and extremely short dististyle.

Species of the genus *Xenohalea* Kieffer have the female claws unequal on all legs and the ventral batonnets extend along the length of the fifth tarsomeres, but the genus is more closely related to *Sphaeromias* Curtis, with whitish pruinose or pollinose body and whitish wings, the costa longer, the female claws long and curving without the external basal teeth, the femora not clubbed, and the abdomen not petiolate.

#### KEY TO FEMALES OF ORIENTAL SPECIES OF *DIBEZZIA*

1. Larger species, length of body 3.5 mm; femora and tibiae uniformly blackish; longer claw equal to  $\frac{2}{3}$  length of 5th tarsomere on all legs; antennal ratio 2.00 ..... *clavata* Kieffer
- Smaller species, wing length about 2.0 mm; femora and tibiae each with broad distal pale bands; longer claw equal to length of 5th tarsomere on first 4 legs, 1.2 as long on hindleg; antennal ratio 2.38 ..... *debenhamae*, new species

#### *Dibezzia clavata* Kieffer

*Dibezzia clavata* Kieffer, 1911a: 120 (female; India; fig. 5th tarsomere and claws of fore- and hindlegs); Brunetti, 1920: 58 (catalog reference; "paratypes" in Indian Museum).

Female (translated from Kieffer's original description).—Length 3.5 mm. A smooth and shining black species. Antennal segments 3–10 and forelegs testaceous; all tarsi except 5th tarsomeres and extreme distal ends of the others pale; halter dull black. Eyes confluent; vertex in a triangle. Proboscis small, equal to  $\frac{1}{2}$  the height of face. Face strongly convex; palpus black, 4th segment small. Antennal segments 4–10 slightly longer than broad, sub-cylindrical, 3rd a little longer than 4th; 11th equal to 4 preceding segments combined; 11–15 filiform, together  $2\times$  as long as the preceding combined. Mesonotum smooth and densely punctate; thorax a little higher than long. Wing hyaline, with dense microtrichia, fringed on posterior margin; strong veins brown, auxiliary obsolete; cubitus gradually approaching the margin, approximately near wing tip; 1st radial cell nearly reaching tip of radius,  $2\times$  as long as broad; 2nd radial cell not broader than 1st, but  $3\text{--}4\times$  as long;

medial fork located slightly proximad of crossvein; posterior fork located at level of crossvein; anal vein forked. Femora unarmed, the mid- longer than the fore- but very much shorter than the hindfemur; forefemur subcylindrical, the midfemur and very strongly the hindfemur inflated past the middle; all tibiae the same length as femora, the anterior with a yellow and simple comb, the mid- without comb, posterior with a double comb of which the smaller is very dense. Tarsi very much more slender than tibiae. Forebasitarsus shorter than  $\frac{1}{2}$  the length of the tibia, equal to 4 following tarsomeres combined, without palisade setae. Midbasitarsus a little shorter than  $\frac{1}{2}$  the length of tibia. Hindbasitarsus longer than entire tibia, equal to following 4 tarsomeres combined; 2 rows of palisade setae on ventral side of first 2 tarsomeres. Fourth tarsomere of hindleg equal to  $\frac{2}{3}$  the 5th,  $6\times$  as long as broad; 5th tarsomeres of all legs with 4 pairs of long black spines. Anterior claws unequal, with a short basal tooth, the larger more than  $\frac{1}{4}$  the length of the other and equal to  $\frac{2}{3}$  the tarsomere; midclaws like the anterior; posterior claws very unequal, each with a basal tooth, the larger equal to  $\frac{2}{3}$  the segment, the smaller a little longer than basal tooth of the large claw. Abdomen very much longer than rest of body; anterior  $\frac{1}{2}$  narrowed in a cylindrical petiole,  $2\times$  as long as wide and composed of 2 terga, of which the 1st is  $\frac{1}{2}$  as long as the 2nd; posterior  $\frac{1}{2}$  of abdomen broadened, depressed, the terga transverse.

*Dibezzia debenhamae* Wirth and Ratanaworabhan, NEW SPECIES

Fig. 1

Female holotype.—Wing length 2.0 mm; breadth 0.7 mm.

*Head:* Brown. Eyes (Fig. 1c) meeting in a point, separated by a triangular space above. Antenna (Fig. 1a) brown, proximal halves of segments 3–10 and extreme bases of 11–15 pale; lengths of flagellar segments in proportion of 28–15–15–15–15–15–15–75–60–60–60–60; antennal ratio 2.38, the 5 distal segments extremely elongate, the 11th unusually so. Palpus (Fig. 1b) dark brown, slender; lengths of segments in proportion of 6–15–20–13–15; 3rd segment without sensory pit, a few long capitate sensilla scattered on mesal face. Proboscis (Fig. 1c) short; mandible (Fig. 1d) with 9–10 coarse teeth.

*Thorax:* Dark brownish black; integument with small setulae arising obliquely from microtubercles (Fig. 1c); mesonotum with distinct upright spine on anteromedian margin. Legs (Fig. 1g) dark brown with yellowish-brown bands on distal halves of fore- and midfemora and all tibiae, and a narrow subapical band on swollen distal portion of hindfemur. Hindtibial comb with 9 yellowish spines, spur poorly developed. Tarsi (Fig. 1h) pale yellowish, distal 3 tarsomeres dark brown; basitarsi of fore- and midlegs

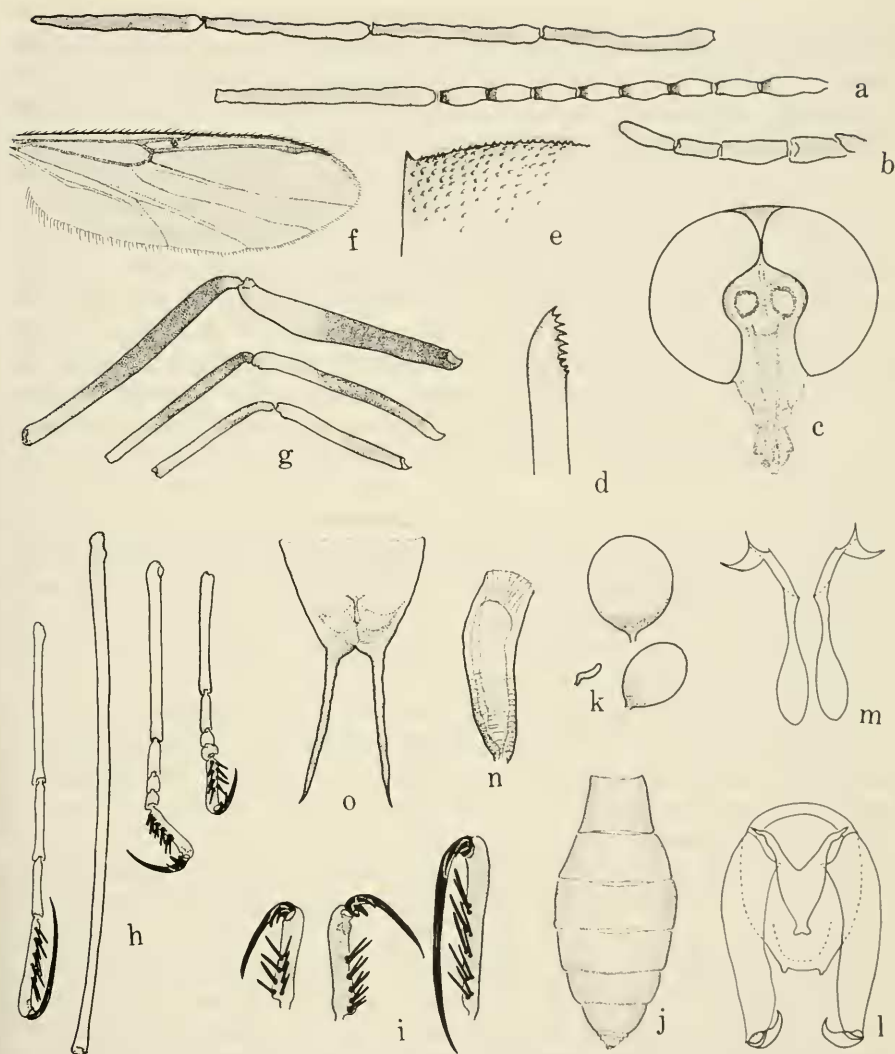


Fig. 1. *Dibezzia debenhamae*. a-k, Female. l-m, Male. n-o, Pupa. a, Antenna, b, Palpus. c, Head, anterior view. d, Mandible. e, Side view of anterior portion of mesonotum. f, Wing. g, Femora and tibiae of (top to bottom) hind-, mid-, and forelegs. h, Tarsi of (left to right) hind-, mid-, and forelegs. i, 5th tarsomeres and claws of (left to right) fore-, mid-, and hindlegs. j, Abdomen, dorsal view. k, Spermathecae. l, Male genitalia, parameres removed. m, Parameres. n, Respiratory horn. o, Terminal abdominal segment.



without ventral palisade setae, on hindbasitarsus 1 complete row of palisade setae and a 2nd row on proximal 0.7; midtibia with a strong black distal spine; a pair of strong black ventral spines at apices of tarsomeres 1 and 2 on midlegs; 4th tarsomeres short and transverse but not distinctly cordate on fore- and midlegs, long and cylindrical on hindlegs; hindtarsi extremely long and slender, hindbasitarsus  $1.03\times$  as long as its tibia; 5th tarsomeres with 4 pairs of strong black ventral batonnets on fore- and midlegs, 5 pairs on hindleg. Claws (Fig. 1i) long and unequal on all legs, each with a short external basal tooth; the long claw about as long as 5th tarsomere on fore- and midlegs,  $1.2\times$  as long on hindleg; the short claw about  $\frac{1}{4}$  as long as the other on fore- and midlegs,  $0.13\times$  as long on hindleg. Wing (Fig. 1f) pale brownish hyaline, veins dark brown; 2 radial cells, the 2nd  $4\times$  as long as 1st; vein R4+5 with a distinct swelling near tip bearing 2 minute hyaline sensory pits; costa prolonged slightly past tip of 2nd radial cell; costal ratio 0.85; media broadly sessile at base; basal cell rather broad distally. Halter dark brown.

*Abdomen:* Dark brown; petiolate at base (Fig. 1j). Spermathecae (Fig. 1k) 2 plus rudimentary 3rd; unequal, each with short slender neck, the larger nearly spherical, measuring 0.115 by 0.087 mm and the other oval, measuring 0.080 by 0.058 mm including necks.

Presumed  $\delta$  allotype.—Wing length 1.52 mm; breadth 0.50 mm. Color markings as in female.

*Head:* Antenna with lengths of flagellar segments in proportion of 35–22–20–18–16–16–16–16–18–20–46–115–95; antennal ratio 1.30; plume short and sparse, not reaching past tip of segment 13. Palpus with lengths of segments in proportion of 6–10–20–16–20; 3rd segment about  $2\times$  as long as broad, without sensory pit.

*Thorax:* Mesonotum with prominent anterior spine; microtubercles sparse. Legs with sparse coarse bristlelike setae much longer than in female; hindfemur less clavate than in female. Hindtibial comb with 7–9 brownish spines, spur poorly developed. Midleg with 1 row of palisade setae on basitarsus; hindleg with 2 rows on basitarsus, 1 row on 2nd tarsomere. Fourth tarsomeres  $1.5\times$  as long as broad, broadened distally but not cordate; 5th tarsomeres unarmed; claws small and equal, nearly straight. Wing brownish infuscated, veins darker; costa shorter than in female, costal ratio 0.75; 2nd radial cell only  $2.4\times$  as long as first. Halter pale brown.

*Abdomen:* Uniformly brownish. Genitalia (Fig. 1l) elongate; 9th sternum a narrow transverse band; 9th tergum ovoid, moderately long, with a pair of short setose apicolateral lobes. Basistyle long and slender, nearly  $6\times$  as long as breadth at midlength, surpassing tip of tergum by  $\frac{1}{3}$  of its length, nearly straight; dististyle a short, curved, hooklike appendage about  $\frac{1}{5}$  as long as basistyle. Aedeagus a typical Y-shaped sclerite with short, nearly

straight basal arms, basal arch extending to nearly  $\frac{1}{2}$  of total length; distal portion with sides slightly convex and tapering to moderately slender, slightly bilobed tip. Parameres (Fig. 1m) separate, each with short basal apodeme and slender, nearly straight basal portion; distal  $\frac{1}{2}$  gradually expanded in a clavate, paddlelike structure with rounded tip extending not quite to apex of 9th tergum.

Pupal exuviae of ♂ allotype.—Length about 4 mm. Color uniformly yellow, respiratory horns slightly darker amber brown. Respiratory horn (Fig. 1n) 0.63 mm long,  $3.6\times$  as long as greatest breadth, narrow at base, slightly bent at distal  $\frac{1}{3}$ ; basal 0.6 with transverse wrinkles; bearing at apex a row of 9–11 spiracular openings. Cephalothorax without prominent spines or tubercles; preapical abdominal segments each with 3 pairs of long, sharp-pointed, lateral posteromarginal spines, other tubercles not developed; terminal segment (Fig. 1o) with a straight, caudally directed pair of long, slender, pointed processes, longer than basal portion of segment.

Distribution.—Malaysia, Thailand.

Types.—Holotype ♀, Kuala Singgora, Pahang, Malaysia, 17 July 1958, R. H. Wharton, light at edge of padi field (type no. 70676, USNM). Allotype male with pupal exuviae, Singapore, June 1959, D. H. Colless, reared from pupa in tree hole (USNM). Paratypes, 2 ♂, 6 ♀, as follows: MALAYSIA: Pahang, same data as for holotype except collected 15 Feb. 1959 at Maran, 1 ♀ (USNM); Singapore, same data as for allotype (CSIRO, Canberra, Australia); Selangor, Ulu Gombak Forest Reserve, 9 Oct. 1960, H. E. McClure, reared, 1 ♂ (USNM). THAILAND: Chiang Mai, April–May 1958, V. Notananda, light trap, 1 ♀ (USNM); Chiang Mai, Ampur Muang, July, Nov. 1962, J. E. Scanlon, light trap, 2 ♀ (Bishop Museum, Honolulu; Thailand Inst. Sci. Tech. Res., Bangkok); Nong Kai, Ta Bo Dist., 15–16 June 1959, Manop R., light trap, 1 ♀ (British Museum [Nat. Hist.], London); Udon Thani, Ampur Muang, Sept. 1962, J. E. Scanlon, light trap, 1 ♀ (USNM).

Discussion.—The species is named for Dr. Margaret L. Debenham of the University of Sydney in recognition of her significant contributions to the taxonomic knowledge of Australian ceratopogonids, especially her monograph on the Australian Heteromyiini and Sphaeromyiini (1974).

*Dibezzia debenhamae* is readily separated from *D. clavata*, the only other known Oriental species, by the characters given in the key. We are reasonably confident that we have correctly associated the male sex of this species, but some doubt remains because we do not have a reared association with matching pupae. The significantly shorter male costa and second radial cell, as well as the difference in segmental distribution of the palisade setae on the tarsi and the color of the spines in the hindtibial comb, cause us some doubts as to the association.

*Mackerrasomyia indica* (Kieffer), NEW COMBINATION

*Heteromyia indica* Kieffer, 1913: 183 (female; India); Brunetti, 1920: 55 (catalog reference); Edwards, 1933: 254 (notes; compared with *Palpomysia pendleburyi* Edwards).

*Dibezzia indica* (Kieffer); Wirth, 1973: 379 (combination; catalog reference).

Type.—♀, Maddathoray, base of W. Ghats, Travancore, 17 Nov., 1 ♀ (N. Annandale) (in Indian Museum, Calcutta).

Discussion.—Wirth (1973) placed this species in *Dibezzia* on the basis of Kieffer's statement that the female tarsal claws are unequal on all legs. However, on rereading Kieffer's description it appears that Wirth's placement was erroneous for the following reasons: Kieffer described *Heteromyia indica* as having the forefemur very swollen, studded with spinules on all the ventral surface that also is traversed by a longitudinal furrow; the foretibia is weakly arcuate, placed in this furrow in repose. In addition all the fourth tarsomeres are cordiform. The female tarsal claws are described (on all legs) as unequal, the larger simple, equally half the length of the tarsomere, the other slightly shorter, with a curved basal tooth attaining a fourth the length of the claw. The structure of the forefemur and foretibia and the cordiform fourth tarsomeres are characteristic of the genus *Mackerrasomyia* Debenham and not easily confused with *Dibezzia* species; the description of the claw structure is somewhat ambiguous and would fit *Mackerrasomyia* if Kieffer had viewed the claws at an angle so that one would appear foreshortened. Kieffer described the mid- and hindfemora of *indica* as unarmed, which does not fit the known species of *Mackerrasomyia*.

Otherwise *M. indica* is similar to the only other known Oriental species, *Mackerrasomyia caesia* (Macfie) (combination by de Meillon and Wirth, 1979), but the latter differs in having the foretibia dark brown at the base and tip instead of all pale and the midtibia pale on the proximal  $\frac{2}{3}$  rather than on the distal half, and the mid- and hindfemora are each armed ventrally with two spines.

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